

to remark on the panic respecting its introduction into England. He approved of restrictive legislation, but said it was as much needed four or five years ago as now. He believed if the beetle could have been introduced if would have been ere now, not so much among potatoes, which were mostly imported from America for seed, in a very clean state, or through the reception of specimens by scientific men, as in a promiscuous manner in general merchandise, owing to its great abundance on the quays of New York, &c. But there was much reason to expect the beetle could not readily be acclimatised in our moist climate. American animals in general failed to spread in Europe. Moreover, Great Britain possessed many insectivorous birds which had no representatives in the United States.

Prof. McNab read several important papers on botanical subjects. One, *On the Movement of Water in Plants*, gave an account of researches by Professors Pfitzer and Hoehnel, continuing and confirming results arrived at by his own investigations. Prof. McNab also brought forward a revised classification of plants, in which he adopted the term Order for the larger groups sometimes called cohorts, and in which the apetalæ were distributed among the petaloid orders to which they are allied. He further gave a synopsis of the present knowledge of fossil flowering plants, showing that Haeckel's postulates as to the evolution and period of first appearance of flowering plants were already shown to be false by new discoveries. It appeared, on the whole, that the gamopetalous forms arose later than the dialypetalæ. Prof. McNab inclined to the opinion that while the monocotyledons were monophyletic, or arose through one line of descent, the dicotyledons were polyphyletic, or derived from several main stocks.

Other papers of interest on botany were by Prof. Dickson, *On the Structure of the Pitcher of Cephalotus*, and by Mr. A. S. Watson, *On Structural Characters in Relation to Habitat in Plants*.

Prof. Rolleston described several features of interest in the zoology of New Guinea, especially the new Echidna, of which he had received a specimen. He detailed the evidences of the former connection by land between New Guinea and Australia, and accounted for the divergence between the vegetation of the two by influences due to the high mountains of New Guinea and the great barren plains of Australia. Mr. W. Ackroyd read a paper *On the Colours of Animals*. A contribution was read from Dr. Otto Finsch, giving the results of the North German Exploring Expedition to Western Siberia. Dr. G. Bennett, from Australia, gave an interesting account of the habits of the pearly Nautilus.

SECTION E.—GEOGRAPHY.

IN this Section, presided over by Admiral Sir Erasmus Ommanney, the president's address consisted of a *résumé* of geographical discovery during the past forty years. Among the papers read none were of special interest.

Major Wilson read a paper by Lieut. Kitchener, R.E., *Report of the Line of Levels from the Mediterranean to the Sea of Galilee*. The levelling commenced in June, 1875, but was soon interrupted by local circumstances. It was resumed in March, 1877, and carried to a successful conclusion by Lieut. Kitchener. There had, as yet, however, been no opportunity of applying corrections. The result of the work showed the depression of the Sea of Galilee to be 682·544 feet. Fortunately they had a perfectly calm day for securing the sea-level. The sea left a clearly-defined white mark at its highest part; the depression shown by Kitchener's observations was some forty or fifty feet greater than had been generally supposed. The depression of the Dead Sea was 1,292 feet, which gave to the Jordan a fall of a little over 600 feet; this fall was nearly even throughout, although there were one or two rapids in its course. The deepest part of the Jordan Valley would be 1,300 feet below the level of the Mediterranean.

Commander Cameron read a paper *On the Proposed Stations in Central Africa, as Bases for Future Exploration*. He thought the best means for the exploration of the continent would be the establishment of trading societies after the fashion of the East Indian and Hudson's Bay Companies, but the spirit of the age was against the granting of sovereign powers to commercial companies. That being so, he considered a system of central stations, placed at intervals of from 200 to 250 miles distant, the best available. The new stations should be placed under the charge of a consul or a vice-consul, or of consular agents, but if

the British Government hesitated to undertake the responsibility, the Seyyid of Zanzibar should be asked to accept it, and he believed most of the traders and shyas would recognise the authority of his highness. The stations might be turned to account, not only for the purpose of map-making, but of ascertaining the commercial value of the surrounding districts, obtaining meteorological observations and botanical and zoological collections, accustoming the neighbouring populations to the nature and advantages of civilised rule, systematically extirpating the slave trade, and diverting the traffic now employed in this infamous trade to the development of the enormous national wealth of the continent. In concluding, Commander Cameron made an appeal on behalf of the British Society for African Exploration. He warned his audience that unless Britain speedily bestirred itself it would lose the pre-eminence it long enjoyed among the countries of Europe. At the call of its sovereign the little kingdom of Belgium had contributed 12,000*l.* for the fitting out of an expedition. Portugal had contributed 20,000*l.*, and he hoped the British public would not fail to do their duty as respects the opening up to civilisation of Africa. The more rapidly the light of civilisation is introduced into the continent the more rapidly would the slave trade and domestic slavery die away and become a thing of the past.

A paper by Mr. W. H. Tietkens, *On the Latest Exploring Expedition across Australia*, was read by Mr. Bates. It described the journey made in 1875 by Mr. Ernest Giles, accompanied by the author of the paper and by Mr. Young, from the settlements of South Australia to those of Western Australia. The result of the journey was the conclusion that the occupation of some portions of the country cannot be long delayed, being well adapted for wool growing, but the writer confirmed the opinion expressed by other travellers that the region between lat. 21° and 30°, and long. 123° and 132°, can never be colonised, and that any white men settling in it would become like the wandering nomads now inhabiting it. The expedition was most adventurous owing to the attacks made upon it by some of the natives, and also to the difficulties arising from scarcity of water, which, at one time, threatened to terminate the career of the travellers.

Mr. Trelawny Saunders called in question the conclusions come to by the author of the paper as to the future of Australia, and said such a future would be a serious matter for Plymouth, which was one of the great ports of emigration to Australia. He placed against this opinion the authority of Mr. Landsborough, who had recently described the great physical changes taking place in the Australian continent, in consequence of the occupation of it by our countrymen. Trees were growing where none were previously to be seen, the natives being prevented from burning the long grass for the purpose of getting game. The growth of forests would cause a greater rainfall, and lead to the improvement of the productive qualities of the country.

Col. Godwin-Austen read a paper *On the Course of the Brahmaputra or Sanpu*. The author's argument, founded on researches and surveys in Assam, was that the true outlet of this great river was by the Sukushiri, and not, as was generally supposed, by the Deipong.

THE FRENCH ASSOCIATION AT HAVRE

HAVRE, August 30

THE final meeting took place this afternoon at 2 o'clock, under the presidency of M. Broca.

Montpellier has been selected as the place of meeting for 1879. The University of Montpellier has been for centuries a rival to Paris, and even now is bold enough to compete with its formidable rival. Montpellier is also notable as the birthplace of Auguste Comte, the founder of Positivism. A number of scientific gentlemen have subscribed a large sum to receive the Association in 1879; the General and Municipal Councils will also vote a large sum.

It has been suggested by some influential members that the meeting of 1880 should be held in Algeria. But the vote will not be taken till next year at Paris. The year 1880 is the fiftieth anniversary of the conquest of Algeria. There are at the present time very few scientific institutions in the colony. Should the choice be made, the Algiers Academy would probably be then transformed into a University for Algeria.

The Association, at the close of the Havre meeting, has voted

an exceedingly limited number of recommendations to the Government. One of them relates to the organisation of the meteorological service. The Association directs the attention of the Government to the inferiority of French meteorology, and urges the Government to establish an official investigation into its working. All efforts to take the Service des Avertissements out of the hands of the observatory have been defeated. The proposed reform does not aim at diminishing the influence of M. Leverrier on the service he has created in France.

A request is to be sent to the Government to endow the Geological Society of Normandy with the privileges of an institution of public interest, which means to grant it a charter and incorporate it. It is expected that the admirable geological exhibitions collected through M. Lennier's exertions will remain permanent, and become a fair specimen of regional geology. A number of exhibitors have consented either to give their objects or to lend them until similar objects can be procured in their stead. M. Lennier, whose exertions have been indefatigable, is the director and founder of the Havre Aquarium, which is a model institution, not for the variety of species, but for the number of objects and the health of the animals.

The several industrial establishments at Havre were opened for public inspection, as well as the Government buildings. The most interesting object was a fog trumpet of British make. The steam engine working it has a power of three horses. It is calculated to compress about 800 litres of air at a pressure of little more than two atmospheres in two tanks put into communication by a large tube. One of these tanks is in communication with the pump, and the other with the trumpet. The latter is closed by a self-acting valve, which opens once every forty-eight seconds, and during seven seconds gives a voluminous sound in *la* of the diapason.

The last excursion (to Rouen) was more successful than the first. The *Frigorifique* had been sent from Havre to Rouen in order to increase the attraction, and was visited by many of the excursionists.

The number of members of the Havre meeting was not more than 600 altogether. The foreign members numbered about forty, upwards of twenty being Englishmen. Very few ladies attended the proceedings. No final banquet took place, owing probably to the fear of some political discussion disturbing an assembly which ought to be devoted entirely to science.

There is only a single scientific society in Havre which, in spite of its ambitious title (*Société d'Etudes diverses*) has only sixty members out of a population of 85,000, including more than fifty millionaires. The society meets regularly and publishes yearly a handsome volume. It has been decided to establish a local society of commercial geography, and a local committee to collect meteorological observations taken on board the transatlantic steamers.

If we consider the work done in certain sections the Havre meeting has not been a failure; but it was altogether a sectional meeting from the inaugural speech of President Broca to the two or three lectures which were delivered in the theatre. We are confident that M. Fremy will spare no pains to render the Paris meeting next year a success and as far as possible international. He will endeavour to get the presidents of sections each to deliver an inaugural address. It is intended to establish a temporary daily newspaper to publish at full length the reports of sectional proceedings, &c.

In the Section of Meteorology the principal business was the vote of the requisition sent to the Government, which will probably induce the Ministry to increase the grant to French meteorology. The majority of the section are in favour of the establishment of a central meteorological institute to investigate large meteorological problems and centralise all meteorological services except weather previsions. A resolution was proposed by Dr. Janssen, urging transatlantic companies to take meteorological observations on board; another resolution asked M. Giffard to organise a meteorological observatory on board his captive balloon, during the exhibition of 1878. Mr. James Glaisher gave an address on the result of his thirty scientific ascents, and the experiments made in the Ashburham captive balloon. His address was well received, and he was invited to sit with the bureau. M. Alluard, the Director of the Puy-de-Dôme Observatory, engaged to establish intermediate stations on the flanks of the mountain, and to keep observations during the time when the monster captive balloon is making its ascents. This proposal will be communicated to Gen. Nansouty, Director of the Pic-du-Midi Observatory. A resolution was voted protesting against the delays in the construction of a telegraph line

from Pic-du-Midi to Bagnères, for the purpose of sending regular observations during the time when the observatory is cut off by snow from all communication with the world below.

M. Alluard presented to the section diagrams of comparative barometric measures taken on the summit of the Puy-de-Dôme and at Clermont-Ferrand during storms. This shows clearly that the law of pressure varies in inverse ratio, diminishing on the top of the mountains when increasing at Clermont, and *vice versa*. It shows evidently that storms are produced, not by a single wind, but by a conflict of several winds at a certain distance from the earth.

In the Geological Section a large proportion of the papers were on various points connected with the geology of Normandy, one of the most important being a paper by M. Morière on the presence of the liassic stage in the department of Orne and on the fossils he has collected during many years investigation into the geology of the region. In this section, also, M. Pomel read a long paper to prove that M. Roudaire's project of an inland sea in Algeria, of which we recently gave details, is impossible. M. Pomel maintains that the level of the Chotts is too high, and that if by any process they could be filled, the water would very soon find its way back to the Mediterranean. Another paper of some importance was by MM. de Tromelin and Grasset, being a "Summary Study of the Palæozoic Fauna of Lower Languedoc and the Pyrenees," for the purpose of comparing the primary formations of the South with those of the North-West of France. M. Jannettaz gave an account of his observations on the propagation of heat in schistose rocks and in crystals. From his experiments he concludes that heat is transmitted more readily along the planes of cleavage of crystals and along the plane of schistosity of slates, gneiss, crystalline or agillaceous schists, than along the direction perpendicular to these planes. He thinks we may thus explain, to a great extent, the variation observed in the increase of temperature with depth in different parts of the globe.

In the Botanical Section M. Corenwinder continued his account of his investigations on the Functions of Leaves. After twenty-five years' work M. Corenwinder thus sums up the results he has obtained:—The leaves of vegetables in their relations to the atmospheric air are the seat of two distinct functions. By their protoplasm they absorb oxygen and constantly exhale carbonic acid. By their chlorophyll, they inspire, on the contrary, during the day only, carbonic acid, and expire oxygen. In their early stage the protoplasm predominates; chlorophyll is not abundant. Hence the respiratory function predominates during all that period over the chlorophyllian function, and consequently leaves exhale carbonic acid without interruption. In proportion as leaves grow the colourless protoplasm diminishes and the chlorophyll increases; thus the capacity of emitting carbonic acid rapidly decreases, and soon they exhale, during the day, nothing but oxygen gas. Henceforth it is only by shutting off or diminishing the light, when the action of the chlorophyll is diminished or suspended, that the effect of respiration becomes more or less sensible. There is then among living beings only one kind of respiration. The part played by chlorophyll is of a different order; it is an act of assimilation which has nothing in common with the preceding. M. Corenwinder hopes that henceforth it will cease to be taught that plants are provided with two respirations, one for the day and the other for the night.

NOTES

WE are informed by a cable telegram from a New York correspondent that Prof. O. C. Marsh, the eminent palæontologist, has been elected president of next year's meeting of the American Association for the Advancement of Science, which has just concluded its Nashville session. We have received the *Proceedings* of the last year's meeting at Buffalo.

THE Aquarium Winter Garden at Tynemouth, near Newcastle, is rapidly approaching completion. The building occupies a commanding position on the Long Sands between the town of Tynemouth and the little fishing village of Cullercoats. The entire basement is devoted to the Aquarium with its reservoirs and pumping machinery, and the show tanks, of which there will be both a sea and a fresh-water series, will contain